DEPARTMENT OF MECHANICAL ENGINEERING

Overview

- Problem: Traditional nail guns are bulky, limiting precision in tight or overhead spaces.
- Goal:
 - Create a low-profile solution within 4" height and 12" length for better maneuverability.
 - Chose an accessory over a full redesign to avoid high costs, complex certification, and manufacturing challenges.
 - Built on the proven BANKS Palm Nailer platform to enhance reach, control, and safety.
 - Modular extension reduces cost, simplifies production, and speeds up user adoption.

• Key Customer Requirements:

- Compact Size
- Precision and Control
- Ease of Use



TEAM Nailed It Palm Nailer Handle Extension

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Sustainability & Human Impact

Social Impact

- Enhances safety with a dual-valve trigger that prevents misfires and bent nails—addressing risks in a tool category responsible for a significant number of injuries annually.
- Cuts job time for complex tasks. Improves access and control in tight angles, enabling safer and more precise operation.
- Ergonomic design and balanced weight reduce user fatigue during extended use.

Environmental Considerations

- Material-efficient build using 6061-T6 aluminum and PA6 keeps unit weight under 1 kg.
- Modular construction supports easy disassembly and part-level repairs, minimizing tool waste.
- Pressure regulation and accuracy reduce surface damage and jobsite material waste.

Economic Viability

- Leverages the existing BANKS platform to minimize development overhead.
- Uses off-the-shelf valves and standard components to reduce cost and streamline production.
- Durable yet repairable, reducing long-term costs for end users.

 - with OSHA standards.
 - and simple field repairs.



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Performance Summary

Getting the Job Done: The handle extension enhances the BANKS Nailer by improving precision, safety, and user control—without compromising its compact power.

On-the-Fly Pressure Control: A built-in regulator lets users adjust pressure at the handle, streamlining workflows and preventing material damage.

Accurate, Safer Firing: A custom dual-valve system restricts airflow until the trigger is engaged, minimizing misfires and boosting strike accuracy in tight or angled positions.

User-Centered Ergonomics: Designed with input from an industry engineer, the handle features optimized grip geometry and spacing to reduce fatigue in extended use.

Engineering-Validated Durability: FEA and verification calculations confirm structural integrity under load; dovetail joints, prongs, and gaskets withstand nailing and 100 psi pressure.

Lightweight & Balanced: Weighing under 1 kg with a balanced center of gravity, the tool supports stable, one-handed operation—even overhead.

Safe to Use: Surface temperatures stay below 90°F and noise remains under 85 dB, complying

Built for Scale: Modular design and injection-ready components support low-cost manufacturing





